

Vertex N

N-type i-TOPCon Bifacial Dual Glass
Monocrystalline module

PRODUCT: TSM-XXXNEG19RC.20

POWER RANGE: 585-620W

620W

MAXIMUM POWER OUTPUT

0~+5W

BINNING TOLERANCE

23.0%

MAXIMUM EFFICIENCY



High customer value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance of System) cost, shorter payback time
- More energy harvest with cutting-edge N-type i-TOPCon technology
- Designed for compatibility with existing mainstream system components
- Higher container space utilization effectively reduces the freight cost



High power up to 620 W

- Up to 23.0% module efficiency with high density interconnect technology
- SMBB (Super multi-busbar) technology for better light trapping effect, lower series resistance and improved current collection



High reliability

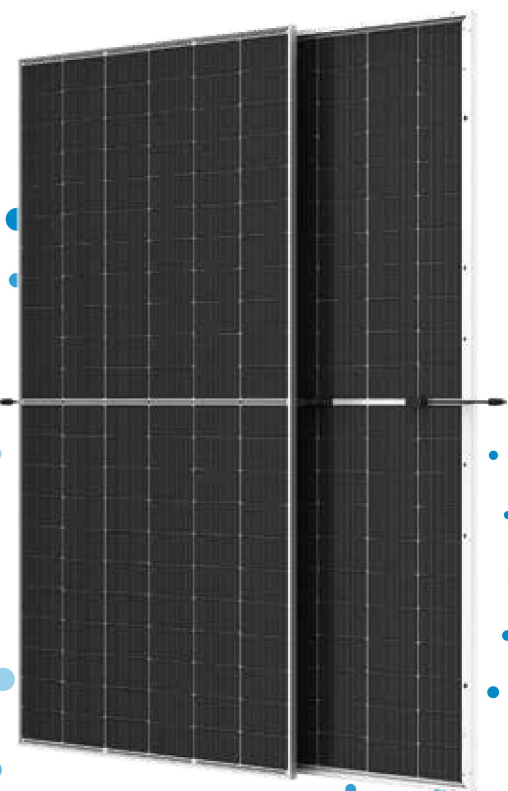
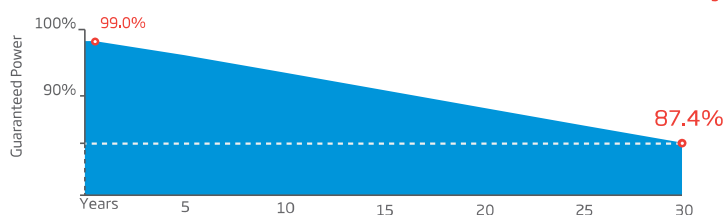
- Minimized micro-cracks with innovative non-destructive cutting technology
- Fire class rating C
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



High energy yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- Lower degradation: 1% first year, 0.4% annually thereafter
- Lower temperature coefficient (-0.29%/°C)
- Up to 30% additional power gain from back side depending on albedo

Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



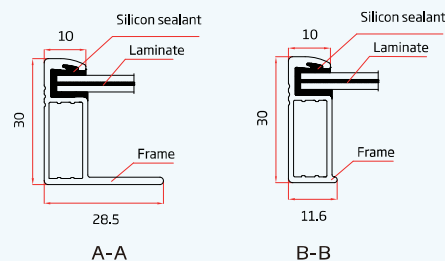
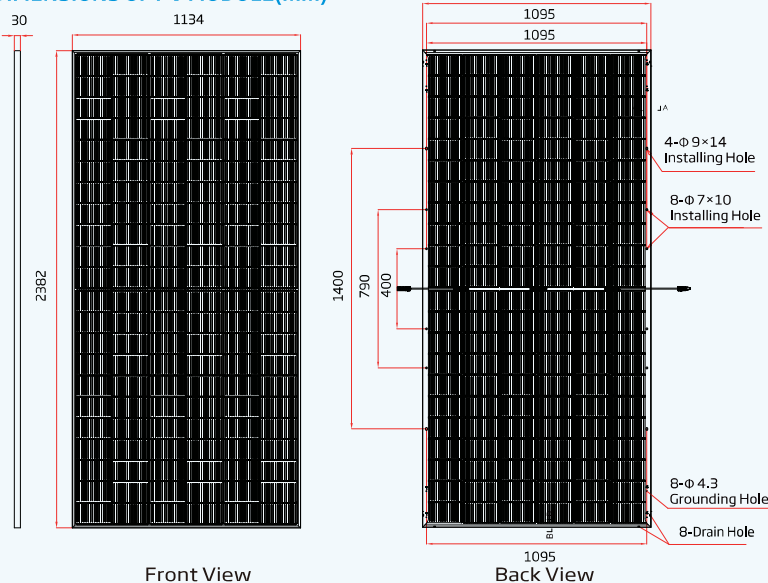
Comprehensive Products and System Certificates



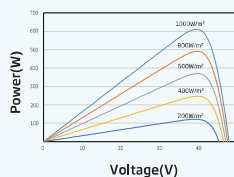
IEC61215/IEC61730
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System

Trinasolar

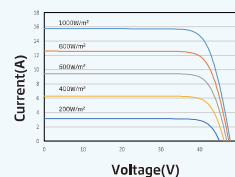
DIMENSIONS OF PV MODULE(mm)



P-V CURVES OF PV MODULE (605 W)



I-V CURVES OF PV MODULE (605 W)



MECHANICAL DATA

Solar Cells	N-type Monocrystalline
No. of cells	132 cells
Module Dimensions	2382×1134×30 mm (93.78×44.65×1.18 inches)
Weight	33.7kg (74.3 lb)
Front Glass	2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)

Frame	30mm(1.18 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated (TS306F20/F20T)
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²) Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	Staubli MC4 EVO2

ELECTRICAL DATA (STC & NOCT&BNPI) TSM-XXXNEG19RC.20(XXX=585-620)

Testing Condition	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI
Peak Power Watts-P _{MAX} (Wp)*	585	447	648	590	450	654	595	454	659	600	459	665	605	462	670	610	466	676	615	469	681
Binning Tolerance-P _{MAX} (W)	0 ~ +5																				
Maximum Power Voltage-V _{MPP} (V)	39.5	37.2	39.5	39.7	37.4	39.7	40.0	37.6	40.0	40.3	37.9	40.3	40.5	38.1	40.5	40.8	38.3	40.8	41.1	38.5	41.1
Maximum Power Current-I _{MPP} (A)	14.82	12.02	16.41	14.86	12.05	16.47	14.89	12.07	16.48	14.91	12.11	16.50	14.94	12.13	16.55	14.96	12.16	16.57	14.98	12.19	16.58
Open Circuit Voltage-V _{OC} (V)	47.5	45.1	47.5	47.8	45.4	47.8	48.1	45.7	48.1	48.4	46.0	48.4	48.7	46.2	48.7	49.0	46.5	49.0	49.3	46.7	49.3
Short Circuit Current-I _{SC} (A)	15.68	12.64	17.37	15.72	12.67	17.42	15.76	12.69	17.46	15.80	12.73	17.51	15.83	12.75	17.54	15.86	12.78	17.57	15.89	12.80	17.61
Module Efficiency η _m (%)	21.7			21.8			22.0			22.2			22.4			22.6			22.8		

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5, NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s, BNPI: Irradiance at 1000W/m² + ϕ×135W/m², Air Mass AM1.5, Temp 25°C *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 5% & 10% backside power gain)

Backside Power Gain	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%
Total Equivalent power -P _{MAX} (Wp)	614	644	620	649	625	655	630	660	635	666	641	671	646	644	651	649
Maximum Power Voltage-V _{MPP} (V)	39.5	39.5	39.7	39.7	40.0	40.0	40.3	40.3	40.5	40.5	40.8	40.8	41.1	41.1	41.4	41.4
Maximum Power Current-I _{MPP} (A)	15.56	16.30	15.60	16.35	15.63	16.38	15.66	16.40	15.69	16.43	15.71	16.46	15.73	16.48	15.74	16.49
Open Circuit Voltage-V _{OC} (V)	47.5	47.5	47.8	47.8	48.1	48.1	48.4	48.4	48.7	48.7	49.0	49.0	49.3	49.3	49.6	49.6
Short Circuit Current-I _{SC} (A)	16.46	17.25	16.51	17.29	16.55	17.34	16.59	17.38	16.62	17.41	16.65	17.45	16.68	17.48	16.71	17.50

Power Bifaciality: 80±7%; ϕP_{max}: 80%±7%; ϕV_{OC}: 100%±3%; ϕI_{SC}: 80%±7%

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P _{MAX}	-0.29%/°C
Temperature Coefficient of V _{OC}	-0.24%/°C
Temperature Coefficient of I _{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+70 °C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	35A

WARRANTY

12 year Product Workmanship Warranty
30 year Power Warranty
1% first year degradation
0.40% Annual Power Attenuation (Power degradation values above apply to frontside, refer to product warranty for power degradation for backside and other details)

PACKAGING CONFIGURATION

Modules per box: 36 pieces
Modules per 40' container: 720 pieces